1   This application is submitted in the name of the following inventor(s):

2

3   <u>Inventor</u>   <u>Citizenship</u>   <u>Residence City and State</u>

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5

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7   5th Floor, Redwood City, CA 94063.

8

9   <u>Title of the Invention</u>

10

11   Collaborative Signal Tracking

12

13   <u>Background of the Invention</u>

14

15   This application claims the benefit of U. S. Provisional Application No.

16   60/473,091 filed 05/23/03 (Attorney Docket No. 215.1018.01) hereby incorporated by reference.

17

18   *1.   Field of the Invention*

19

20   This invention relates to tracking of events in supply chain management.

21

1   *2.   Related Art*

2

3   Supply Chain Management (SCM) is a process-orientated approach to pro-

4   curing, producing, and delivering products and services to customers. SCM has a broad

5   scope that includes suppliers, sub-suppliers, internal operations, trade customers, retail

6   customers, and consumers of the products and services (referred to herein as trading part-

7   ners). It covers the management of material, information, and funds flows.   Information

8   passed between collaborative partners is important to the success of SCM. The quality of

9   information, how it is perceived and used is also important to SCM operating efficiently

10   and effectively.

11

12   Using an SCM network, a trading partner (in this case a potential purchaser

13   of goods) can send a purchase order request to suppliers of the goods required. The re-

14   quest may include other details such as the date for delivery and method of payment. Un-

15   fortunately, trading partners often use differing information systems. Moreover, the flow

16   of information from one trading partner to another can be unmonitored and unstructured

17   in such a way that a request for goods from a trading partner can be received at another

18   trading partner more than once. This may cause the receiving trading partner to become

19   · confused, and not know what is truly desired by the potential purchaser.

20

21   First, if more than one request for a bid is created, trading partners submit

22   inaccurate bids. For example, XYZ Electronics decides to carpet the first floor of their

1   two-story office complex.   They request bids from trading partners (carpet suppli-

2   ers/installers) for 1,000 yards of Neon Carpet Company's deep pile blue, catalog number

3   NCC1701B. Later that day, XYZ decides they might as well carpet the second floor too,

4   so they request bids for the same carpet type and quantity. A trading partner receiving the

5   two bids could understandably be confused. The carpet type and quantity are identical in

6   both requests. The payment terms, delivery date, and other order related information will

7   probably also be identical.

8

9   In a case such as this, a trading partner may be unable to enter an accurate

10 bid. The trading partner would not know how much underfelt, how much tackboard, how

11 many workers, and how many delivery trucks to allow for when calculating their bid?

12

13   Second, it is possible for the same request to be received more than once by

14 a trading partner thus leading to confusion. Often, the communication network used by

15 trading partners in a supply chain includes multiple pathways to and from each trading

16 partner. For example, trading partner alpha may have direct links to three other trading

17 partners bravo, charlie, and delta. These three trading partners may have a direct link to a

18 trading partner requesting a bid, which they each pass on to trading partner alpha. Alpha

19 has now received what appears to be requests for three separate bids. Depending on the

20 connectivity between the partners, the three bids could arrive on different days adding to

21 the confusion.

22

1   Third, how does a trading partner interpret two requests for bids that are

2   almost identical or at least similar. In the carpet example given above, suppose the sec-

3   ond request was for Neon Carpet Company's deep pile cyan, catalog number NCC1701C.

4   Should this be interpreted as an additional quantity or as a correction to the first request?

5   Without more information, a trading partner cannot be sure.

6

7   Fourth, a potential purchaser may wish to treat some trading partners differ-

8   ently. Sending a request for bids to a number of trading partners means sending the same

9   request to all or generating individual requests for each trading partner. The first option

10 does not allow for individual treatment of each trading partner, and the second requires

11 more time on the part of the potential purchaser to generate individual requests.

12

13   An important element of supply chain management is that there is effective

14 coordination of all the links in the chain and that it be done as quickly as possible without

15 losing any quality or customer satisfaction. Unfortunately, there are practically an unlim-

16 ited number of scenarios that can create doubt and inefficiency in a supply chain.

17

18   Accordingly, it would be desirable to provide a method of communication

19 between trading partners in a supply chain that does not suffer from the drawbacks of the

20 prior art.

21

22

Summary of the Invention

The invention includes a method and system capable of eliminating errors in communication among trading partners in a supply chain. This is realized in an embodiment of the invention including a central hub to coordinate communication between trading partners. This removes uncertainty as to the uniqueness of any single communication event.

The central hub includes functionality to structure and monitor communication between trading partners in a supply chain. Regardless of the disparate systems and methods used by the trading partners, a layer of standardization is included in communications among them.

An event initiated by a trading partner is assigned a unique signal tracking number by the central hub. Relevant details relating to the event are associated with the signal tracking number and recorded in a database at the central hub. The unique signal tracking number is preferably incorporated into the event. Thereafter, any trading partner receiving the event can ascertain the event's signal tracking number and can compare it with other events received, thus confusion as to the unique identity of the event is refuted or confirmed.

1   In an aspect of the invention, metadata can be associated with the event and

2   retained in the signal tracking database. This information can be used to further identify

3   important attributes associated with the event. Trading partners can query the database

4   for any additional information that may be available on an event. Such information could

5   be relevant to the event but not actually included in it. For example, an event may refer

6   the receiving trading partner to the metadata relating to the event retained at the hub.

7   This allows the event to be smaller in size, and allows sensitive data to remain at a loca-

8   tion where it can have protected access.

9

10   Access to some or all of the additional data associated with an event may be

11   available to some trading partners and not others. This enables trading partners respond-

12   ing to an event to be treated differently without requiring extensive additional work by the

13   event author.

14

15   Brief Description of the Drawings

16

17   Figure 1 shows a block diagram of a system using a collaborative signal

18   tracking number.

19

20   Figure 2 shows a block diagram of an alternative embodiment of a system

21   using a collaborative signal tracking number.

22

1   Figure 3 shows a process flow diagram of a method of using a collaborative

2   signal tracking number.

3

4   Detailed Description of the Preferred Embodiment

5

6   In the following description, a preferred embodiment of the invention is de-

7   scribed with regard to preferred process steps and data structures. Those skilled in the art

8   would recognize after perusal of this application that embodiments of the invention can

9   be implemented using one or more general purpose processors or special purpose proces-

10 sors or other circuits adapted to particular process steps and data structures described

11 herein, and that implementation of the process steps and data structures described herein

12 would not require undue experimentation or further invention.

13

14
15 *Lexicography*

16

17   The following terms refer or relate to aspects of the invention as described

18 below. The descriptions of general meanings of these terms are not intended to be limit-

19 ing, only illustrative.

20

21 *Supply Chain* – A supply chain is a chain of processes that facilitates business activi-

22   ties between trading partners, from the purchase of raw goods and materials for manu-

23   facturing to delivery of a finished product to an end user. Most organizations have

1   supply chains of varying degrees, depending upon the size of the organization and the

2   type of product manufactured. These networks obtain supplies and components,

3   change these materials into finished products and then distribute them to the customer.

4   The integrated supply chain is highlighted by the synchronization of the flow of in-

5   formation and the flow of goods between trading partners

6

7   • *Supply Chain Management* – Supply Chain Management is a strategy where business

8   partners jointly commit to work closely together, to bring greater value to the con-

9   sumer and/or their customers for the least possible overall supply cost. This coordi-

10   nation includes that of order generation, order taking and order fulfillment/distribution

11   of products, services or information. Effective management must take into account

12   coordinating all the different pieces of this chain as quickly as possible without losing

13   any of the quality or customer satisfaction, while still keeping costs down.

14

15   Effective supply chain management enables business to make informed decisions

16   along the entire supply chain, from acquiring raw materials to manufacturing products

17   to distributing finished goods to the consumer. At each link, businesses need to make

18   the best choices about what their customers need and how they can meet those re-

19   quirements at the lowest possible cost.

20

1   *Event* – In general, an event is a communication initiated from a trading partner within

2   a supply chain to one or more other trading partners within the supply chain. Exam-

3   ples of events include; purchase orders, order confirmations, and delivery schedules.

4

5   • *Trading Partners* – In general, trading partners include suppliers, sub-suppliers, trade

6   customers, retail customers, and consumers of products and services, however, anyone

7   who participates in some portion of the supply chain may be considered a trading

8   partner.

9

10   As noted above, these descriptions of general meanings of these terms are

11   not intended to be limiting, only illustrative. Other and further applications of the inven-

12   tion, including extensions of these terms and concepts, would be clear to those of ordinary

13   skill in the art after perusing this application. These other and further applications are

14   part of the scope and spirit of the invention, and would be clear to those of ordinary skill

15   in the art, without further invention or undue experimentation.

16

17   *System Elements*

18

19   Figure 1 shows a block diagram of a system of using a collaborative signal

20   tracking number.

21

1   A system 100 includes a plurality of trading partner devices 110 associated

2 with a plurality of trading partners 115, a hub 120, and a communication network 130.

3

4   An event 111 preferably includes electronic data in the form of an elec-

5 tronic message. The format of an event 111 is at the discretion of the sending trading

6 partner 115 or in a format agreed to by the sender of the event 111 and the recipient trad-

7 ing partners 115. The format of a message can include purchase orders, order confirma-

8 tions, and other supply chain management communications.

9

10   A trading partner device 110 includes a processor, a main memory, and

11 software for executing instructions (not shown, but understood by one skilled in the art).

12 This software preferably includes browser and other software capable of operating the

13 trading partner device 110 consistent with the invention and further explained herein.

14

15   A trading partner 115 preferably includes a customer 141, a distributor 143,

16 a broker 145, a supplier 147 or other type of member in the supply chain. In an alterna-

17 tive embodiment, a trading partner 115 may include a combination of a customer 141, a

18 distributor 143, a broker 145, and a supplier 147 or some other type of business entity.

19

20   To illustrate an exemplary flow of an event 111 in the system 100, each

21 trading partner device 110 in figure 1 has been assigned a business type of either a cus-

22 tomer 141, distributor 143, broker 145, or supplier 147.

1   The hub 120 includes a signal tracking database 121 for processing, organ-

2   izing and storing signal tracking numbers 123, a processor, a main memory, and software

3   for executing instructions (not shown, but understood by one skilled in the art). This

4   software preferably includes software for allowing the hub 120 to communicate with each

5   trading partner device 110 and to otherwise operate the hub 120 consistent with the in-

6   vention as explained further herein.

7

8   Additional data relating to an event 111 can be stored at the hub 120 when

9   the event 111 is given a signal tracking number 123. The additional data can include

10   other information relating to the event 111 itself or to the trading partner 115 sending the

11   event 111. For example, a digital signature can be stored in the data at the hub 120. By

12   using the hub 120 to store the additional data that may or may not be needed by the re-

13   ceiving trading partner 115, the event 111 is smaller in size allowing its transmission to

14   be more efficient.

15

16   In an alternative embodiment, any portion of additional data can be incorpo-

17   rated into an event 111 and transmitted with it.

18

19   A signal tracking number 123 includes a set of data that uniquely identifies

20   an event 111. When a signal tracking number 123 is provided by the hub 120 it is incor-

21   porated into the event 111 so it may be used to identify it.

22

1   The communication network 130 includes at least a portion of a communi-

2   cation network, such as a LAN, a WAN, the Internet, an intranet, an extranet, a virtual

3   private network, a virtual switched network, or some combination thereof. In a preferred

4   embodiment, the communication network 130 includes a packet switched network such as

5   the Internet, as well as (in addition to or instead of) the communication networks just

6   noted, or any other set of communication networks that enable the elements described

7   herein to perform the functions described herein.

8   The preferred embodiment for the communications network 130 is a prod-

9   uct of the affiliations of trading partners 115 and the evolution of the supply chains in

10   which they participate. As previously stated in the preferred embodiment for this ele-

11   ment, the communications network 130 may include many different types of computer-

12   ized networks. Generally, the more complex the communications network 130, the

13   greater the need for the invention.

14

15   A communication link 113 operates to couple each trading partner device

16   110 and the hub 120 to the communications network 130. When a trading partner device

17   110 is connected to more than one communication network 130, more than one other

18   trading partner device 110, or some combination thereof, more than one communication

19   link 113 may be used.

20

21   A query 117 includes a request to the hub 120 to provide information re-

22   garding an event 111 identified by its signal tracking number 123.

1   A response 119 includes substantially detailed information related to an

2   event 111. The author of an event 111 provides the information contained in a response

3   119. Any additional information is stored at the hub 120. The format of additional in-

4   formation relating to an event can be controlled by the hub 120 or left entirely at the dis-

5   cretion of the authoring trading partner 115.

6

7   *Alternative Embodiment of a System 100*

8

9   Figure 2 shows a block diagram of an alternative embodiment of a system

10   of using a collaborative signal tracking number.

11

12   This embodiment illustrates multiple connectivity between trading partners.

13   The trading partner device 110 (supplier 147) is coupled to the communication network

14   130 and to two other trading partner devices 110 (the distributor 143 and the broker 145).

15

16   This alternative embodiment illustrates how an event 111 can be received

17   by a trading partner device 110 more than once. In this particular example, at least three

18   identical events 111 can be received by the trading partner device 110 operated by the

19   supplier 147. First an event 111 can be received from the customer 141 via the communi-

20   cation network 130. Second, an event 111 can be received from the customer 141 via the

21   communication network 130 through the distributor 143. Third, event 111 can be re-

22   ceived from the customer 141 via the communication network 130 through the broker

1   143.   This alternative embodiment is exemplary and not intended to be limiting. The

2   number of trading partner devices 110 and lines of connectivity are practically without

3   limit.

4

5   *Method of Operation*

6

7   Figure 3 shows a process flow diagram of a method of using a collaborative

8   signal tracking number. The method 300 is performed by the system 100. Although the

9   method 300 is described serially, the steps of the method 300 can be performed by sepa-

10   rate elements in conjunction or in parallel, whether asynchronously, in a pipelined man-

11   ner, or otherwise. There is no particular requirement that the method 300 be performed in

12   the same order in which this description lists the steps, except were so indicated.

13

14   At a flow point 310, the hub 120 is ready to process incoming requests for

15   signal tracking numbers 123 and to respond to a query 117..

16

17   At a step 311, a trading partner 115 authors an event 111, which is gener-

18   ated by the trading partner device 110. The authoring trading partner 115 identifies a list

19   of recipients for the event 111. The event 111 may be of any of the types previously

20   mentioned.

21

1   At a step 313, the trading partner device 110 sends the event to the hub 120

2   for processing. In an alternative embodiment, the trading partner device 110 sends a re-

3   quest for a signal tracking number 123 to the hub 120.

4

5   At a step 315, the hub 120 assigns a unique signal tracking number 123 to

6   the event 111 and records the assignment in the signal tracking database 121. Additional

7   information relating to the Event 111 can be recorded at the hub 120 for future reference.

8   The additional information is linked to the event 111 by its signal tracking number 123.

9

10   At a step 317, The event 111 is modified to include the signal tracking

11   number 123. In an alternative embodiment, the signal tracking number 123 is transmitted

12   to the trading partner device 110 where the event 111 is being authored. At that location

13   the event 111 is modified to include the signal tracking number 123.

14

15   At a step 319, the event 111 is transmitted to the list of recipients identified

16   by the authoring trading partner 115.

17

18   At a flow point 321, the process may be repeated starting at step 310 to en-

19   able additional events 111 to be generated and assigned a signal tracking number 123.

20

21   At a step 323, a query 117 is sent from a trading partner device 110 to the

22   hub 120. Initiating a query 117 allows the trading partner 115 who received the event 111

1   to obtain additional information regarding the event 111. Upon receipt of an event 111, a

2   query 117 can be sent manually or automatically by the receiving trading partner device

3   110 to establish the status of the event 111 and obtain any additional information avail-

4   able.

5

6   Although the unique identity of events 111 can be gleaned by comparing the

7   assigned signal tracking numbers 123, additional information may be necessary to clarify

8   similar appearing events 111 that differ only by the signal tracking numbers 123 and to

9   ascertain the exact intent of the sending trading partner 115. For example, a trading part-

10   ner may issue a first purchase order for 100 gallons of purple paint and then a second pur-

11   chase order for the exact same product and quantity. A trading partner 115 may wonder

12   whether one of the purchase orders is an error or a true additional request. The additional

13   data stored at the hub 120 can be used to clarify these common issues.

14

15   At a step 325, a response 119 is sent by the hub 120 to the trading partner

16   device 110 that initiated the query 117. The signal tracking number 123 in the query 117

17   is matched with the appropriate record in the signal tracking database 121. Any addi-

18   tional data can be included in the response 119 as requested. If the event 111 is found to

19   be a duplicate, the trading partner device 110 can be configured to automatically discard it

20   or otherwise process it as a duplicate event 111.

21

1   At a flow point 327, the process may be repeated starting at step 323 to al-

2   low additional events 111 to be queried.

3

4   *Generality of the Invention*

5

6   The invention has applicability and generality to other aspects of business to

7   business communication and collaboration between business entities.

8

9   *Alternative Embodiments*

10

11   Although preferred embodiments are disclosed herein, many variations are

12   possible which remain within the concept, scope, and spirit of the invention, and these

13   variations would become clear to those skilled in the art after perusal of this application.